No-cook process at very high gravity of various cassava starches for ethanol production

Session name: QUALITY FOODS: Postharvest loss prevention, storage and processing

Please mark oral, poster or both:

x	Session for Oral
	Session for posters

Jhon Larry Moreno [1*], Chu-Ky Son[2], Tuan-Anh Pham[2], Tien Tien Nam[2,3] Hernan Ceballos[1], Dominique Dufour[4], and Thierry Tran[1,4]

1) CIAT, Cali, Colombia, 2) Hanoi University of Science and Technology (HUST), Hanoi, Vietnam, 3) Ho Chi Minh City University of Food Industry, Ho Chi Minh City, Vietnam 4) CIRAD, UMR Qualisud, Montpellier, France
*j.l.moreno@cgiar.org

No-cook process or simultaneous liquefaction, saccharification and fermentation (SLSF) at very high gravity (VHG) of cassava starch from 6 genotypes for ethanol production was conducted at lab scale. The SLSF-VHG process was performed in a unique fermenter at 30°C. Cassava starch was dispersed in ultrapure water to reach 300 g/l of dry matter and then the mixture was liquefied, saccharified and fermented simultaneously, by the action of an enzymatic cocktail, active dry yeast, KH_2PO_4 and urea. The content of sugars, ethanol, lactic acid and acetic acid was monitored by HPLC during the process, as well as dry matter and pH. Under these conditions, the SLSF-VHG process finished after 160 hours. The best yield was 17.6 % v/v ethanol for a genotype with double mutant characteristics, i.e. 88.1% of the theoretical ethanol yield. At the end of the fermentation, the content of lactic and acetic acid was in a range of 0.6-1.1 and 0.5-1.2 mg/ml, respectively. For all tests the content of dry matter and pH decreased at the end of the process. Besides the viscosity also decreased until reaching a very fluid liquid state. The SLSF of cassava starch under VHG condition shows great potential for the ethanol industry because yields of more than 8% ethanol can be achieved which is energetically viable.